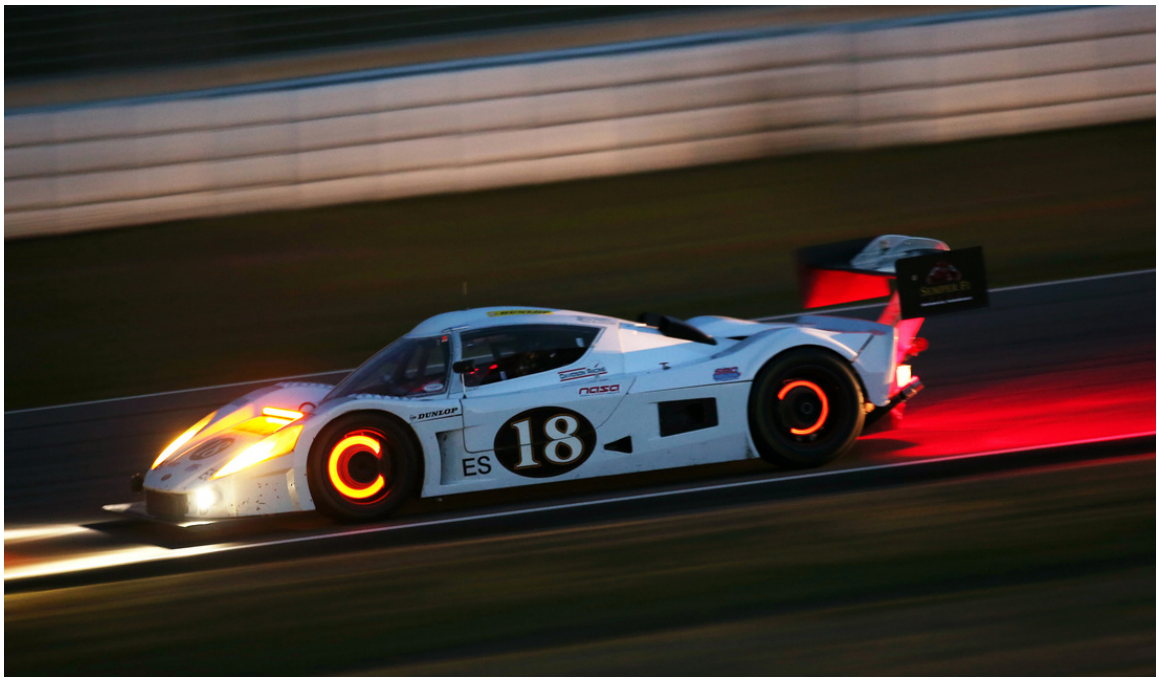


Introduction to the First Law of Thermodynamics
Introduction to Work

First Law of Thermodynamics

$$\Delta E_{sys} = Q_{into\ sys} - W_{by\ sys}$$
$$= Q_{into\ sys} + W_{on\ sys}$$

$$\frac{dE_{CV}}{dt} = \dot{Q}_{into\ CV} - \dot{W}_{by\ CV} + \sum_{into\ CV} \dot{m}e - \sum_{out\ of\ CV} \dot{m}e$$

$$= \dot{Q}_{into\ CV} + \dot{W}_{on\ CV} + \sum_{into\ CV} \dot{m}e - \sum_{out\ of\ CV} \dot{m}e$$

Types of Energy

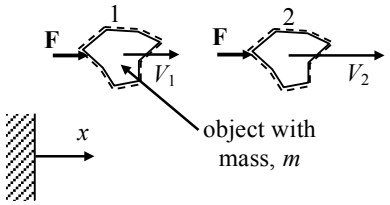
$$\Delta E_{sys} = \Delta U_{sys} + \Delta(KE)_{sys} + \Delta(PE)_{sys}$$

$$\Delta e_{sys} = \Delta u_{sys} + \Delta(ke)_{sys} + \Delta(pe)_{sys}$$

Work (and Power)

$\delta W_{on\ sys} = \vec{F}_{on\ sys} \cdot d\vec{s}$ $\qquad\qquad$ $W_{on\ sys} = \int \vec{F}_{on\ sys} \cdot d\vec{s}$

Work required to accelerate an object



Work required to lift an object in a gravity field